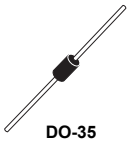
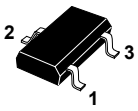
# DB3, DB4, SMDB3

Datasheet

Diac



DO-35




SOT-23

Pin 1 and 3 must be shorted together

## Features

- $V_{BO}$ : 32 V and 40 V
- Low breakover current
- Breakover voltage symmetry : 3V
- ECOPACK®2 compliant

## Applications

- Triggering device for Triac or SCR based motor / light dimmer
- 32 V trigger device for oscillator circuit
- Start up triggering in lighting ballast for CFL, TL or LED lamps

## Description

Functioning as a trigger diode with a fixed voltage reference, the DB3/DB4 series can be used in conjunction with triacs for simplified gate control circuits or as a starting element in fluorescent lamp ballasts.

The surface mount SOT23-3L package allows compact, SMD based designs for automated manufacturing.

| Product status link |
|---|
| DB3 |
| DB4 |
| SMDB3 |

| Product summary | |
|---|---|
| **Part number** | **$V_{BO}$** |
| **SMDB3** | 28 - 36 V |
| **DB3** | 28 - 36 V |
| **DB4** | 35 - 45 V |

# 1 Characteristics

**Table 1. Absolute maximum ratings (limiting values), $T_j$ = 25 °C unless otherwise specified**

| Symbol | Parameter | | Value | Unit |
|---|---|---|---|---|
| $I_{TRM}$ | Repetitive peak on-state current, $t_p$ = 20 µs, F = 120 Hz | SMDB3 | 1.00 | A |
| | | DB3 / DB4 | 2.00 | A |
| $T_{stg}$ | Storage junction temperature range | | -40 to +125 | °C |
| $T_j$ | Operating junction temperature range | | -40 to +125 | °C |

**Table 2. Electrical characteristics ($T_j$ = 25 °C unless otherwise specified)**

| Symbol | Parameter | Test conditions | | SMDB3 | DB3 | DB4 | Unit |
|---|---|---|---|---|---|---|---|
| $V_{BO}$ | Breakover voltage (1) | C = 10 nF (2) | Min. | 28 | 28 | 35 | V |
| | | | Typ. | 32 | 32 | 40 | |
| | | | Max. | 36 | 36 | 45 | |
| I $V_{BO1}$ - $V_{BO2}$ I | Breakover voltage symmetry | C = 10 nF(2) | Max. | 3 | 3 | 3 | V |
| Δ V | Dynamic breakover voltage (1) | $V_{BO}$ and $V_F$ at 10 mA | Min. | 10 | 5 | 5 | V |
| $V_O$ | Output voltage (1) | See Figure 2. Test circuit, (R = 20 Ω) | Min. | 10 | 5 | 5 | V |
| $I_{BO}$ | Breakover current (1) | C = 10 nF (2) | Max. | 10 | 50 | 50 | µA |
| $t_r$ | Rise time (1) | See Figure 3. Rise time measurement | Max. | 0.5 | 2 | 2 | µs |
| $I_R$ | Leakage current (1) | $V_R$ = 0.5 x $V_{BO}$ max | Max. | 1 | 10 | 10 | µA |
| $I_P$ | Peak current (1) | See Figure 2. Test circuit | Min. | 1 | 0.30 | 0.30 | A |

1. *Applicable to both forward and reverse directions.*
2. *Connected in parallel to the device*

Figure 1. **Voltage - current characteristic curve.**

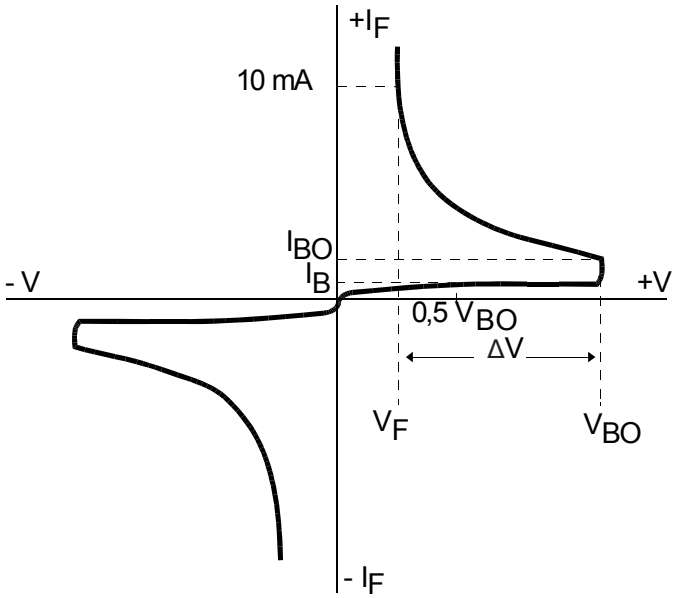



Figure 2. **Test circuit**

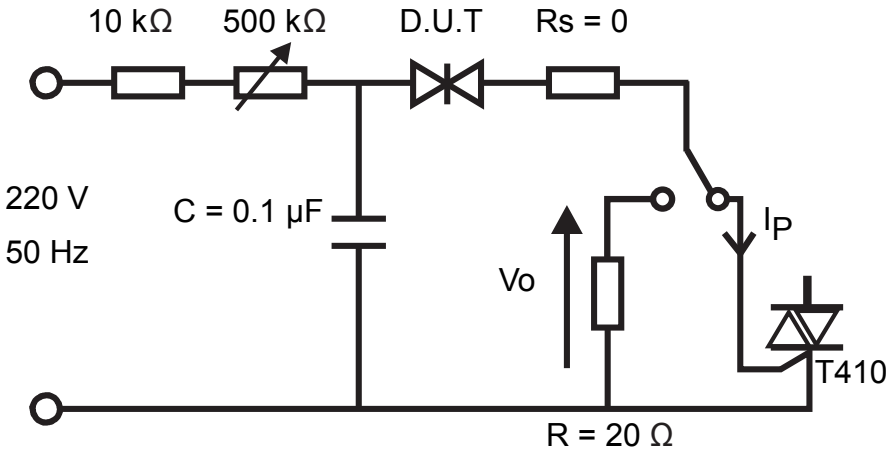
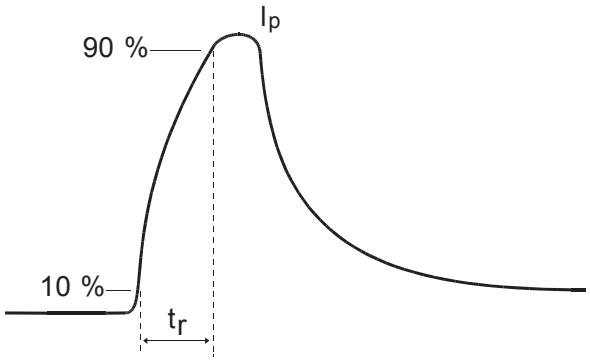


Figure 3. **Rise time measurement**



## 1.1 Characteristics curves

**Figure 4. Relative variation of VBO versus junction temperature (typical values)**

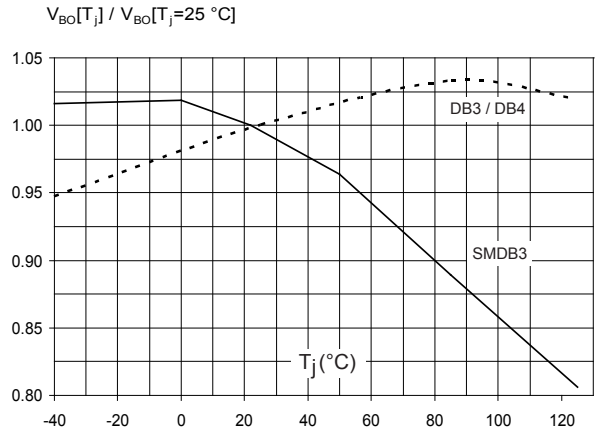



**Figure 5. On-state RMS current versus Triac gate current pulse duration $t_p$**

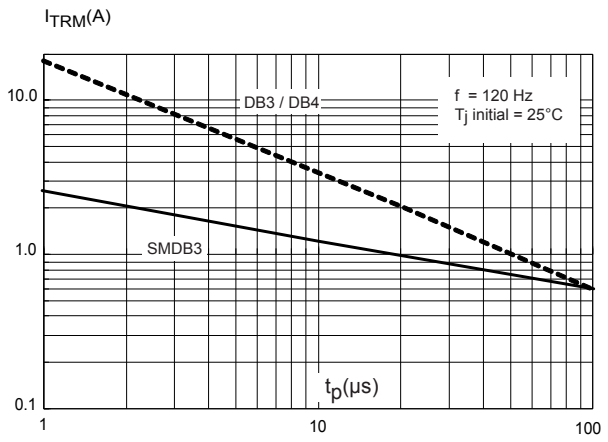
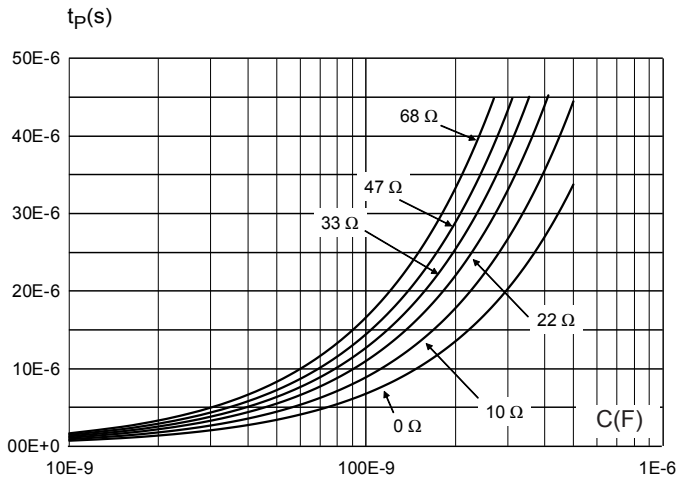



**Figure 6. Triac gate current pulse duration $t_p$ (to have $I_P$ > 50 mA) versus Rs and C values (typical values)**




*Note: according to Figure 2. Test circuit*

# 2 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

## 2.1 SOT23 package information

**Figure 7. SOT23-3L package outline**

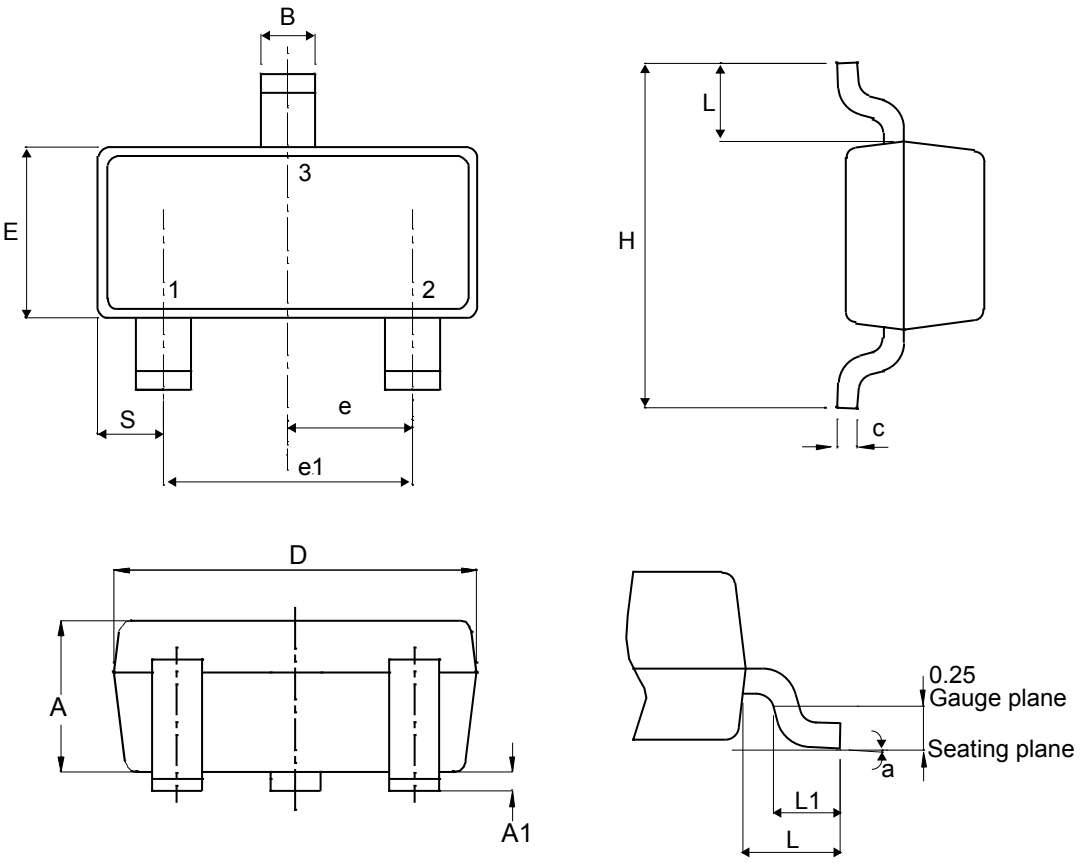
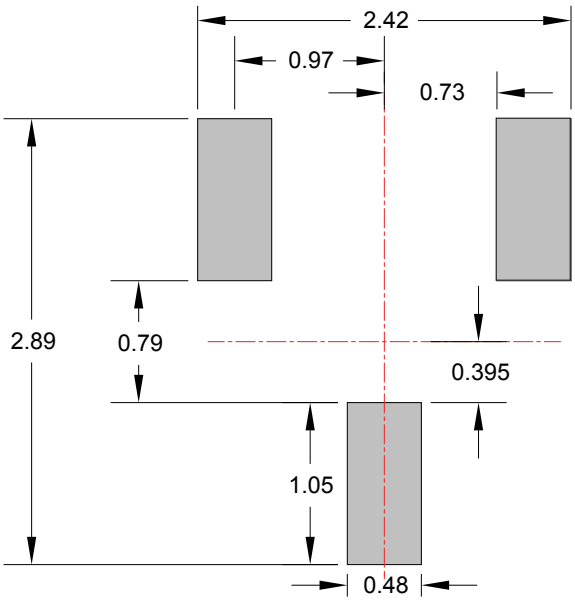


**Table 3. SOT23-3L package mechanical data**

| Ref. | Dimensions | | | | | |
|---|---|---|---|---|---|---|
| | Millimeters | | | Inches (for reference only) | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 0.89 | | 1.40 | 0.0350 | | 0.0551 |
| A1 | 0.00 | | 0.10 | 0.0000 | | 0.0039 |
| B | 0.30 | | 0.51 | 0.0118 | | 0.0201 |
| C | 0.085 | | 0.18 | 0.0033 | | 0.0071 |
| D | 2.75 | | 3.04 | 0.1083 | | 0.1197 |
| e | 0.85 | | 1.05 | 0.0335 | | 0.0413 |
| e1 | 1.70 | | 2.10 | 0.0669 | | 0.0827 |
| E | 1.20 | | 1.75 | 0.0472 | | 0.0689 |
| H | 2.10 | | 3.00 | 0.0827 | | 0.1181 |
| L | | 0.60 | | | 0.0236 | |
| S | 0.35 | | 0.65 | 0.0138 | | 0.256 |
| L1 | 0.25 | | 0.55 | 0.0098 | | 0.0217 |
| a | 0° | | 8° | 0° | | 8° |

**Figure 8. SOT23-3L footprint in mm**



## 2.2 DO-35 package information

Figure 9. **DO-35 package outline**

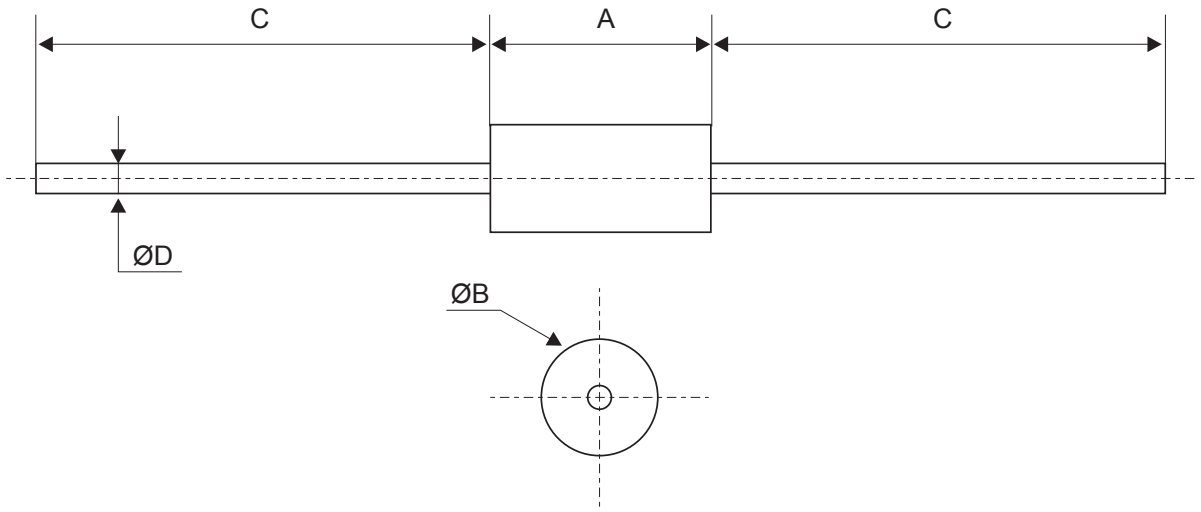



Table 4. **DO-35 package mechanical data**

| Ref. | Dimensions | | | |
|---|---|---|---|---|
| | Millimeters | | Inches (for reference only) | |
| | Min. | Max. | Min. | Max. |
| A | 3.05 | 4.50 | 0.120 | 0.177 |
| B | 1.53 | 2.00 | 0.060 | 0.079 |
| C | 28.00 | 31.00 | 1.102 | 1.220 |
| D | 0.46 | 0.55 | 0.018 | 0.022 |

# 3 Ordering information

Figure 10. **Ordering information scheme**

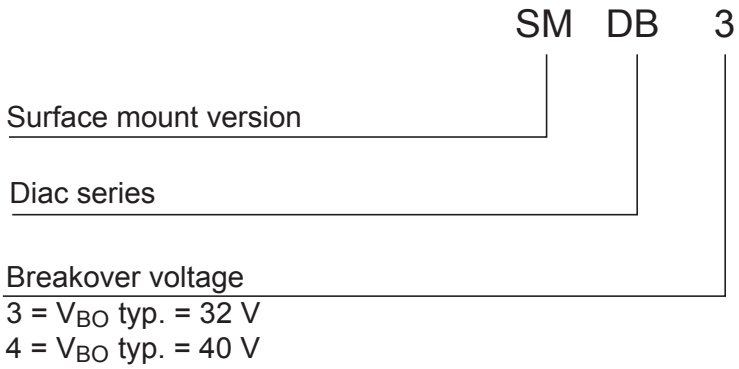



Table 5. **Ordering information**

| Order code | Marking | Package | Weight | Base qty. | Delivery mode |
|---|---|---|---|---|---|
| SMDB3 | DB3 | SOT-23 | 0.01 g | 3000 | Tape and reel |
| DB3 | DB3 (Blue Body Coat) | DO-35 | 0.15 g | 5000 | Tape and reel |
| DB4 | DB4 (Blue Body Coat) | | 0.15 g | 5000 | Tape and reel |

## Revision history

Table 6. **Document revision history**

| Date | Version | Changes |
|---|---|---|
| 18-Jun-2018 | 2 | First release. |
| 14-Dec-2018 | 3 | Minor text change to improve readability. |

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